# Crew members of the Titanic – a lexical temporal account[1]

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**Abstract.** In this paper, I propose an analysis for the temporal interpretation of noun phrases according to which nouns independently locate the time at which they are temporally evaluated depending on noun class and context. I will argue that nouns separate into two aspectual classes: eventive and stative nouns. On top of this, noun phrases possess a covert time pronoun that is semantically under-specified for nouns that are eventive, and restricted to the utterance time if they are stative. This novel approach explains puzzling data and unifies previous accounts by means of extending analyses of verbal tense phenomena (i.e., pronominal tense, superficial tenselessness) to the nominal domain.

**Keywords:** temporal interpretation of noun phrases, nominal lexical tense and aspect, superficial tenselessness

## 1. Introduction

Research on the temporal interpretation of noun phrases (Enç, 1981, 1986; Musan, 1995, 1999; Tonhauser, 2002, 2006, 2020; Rapp, 2015; O'Leary, 2022, among others) has aimed to determine under which conditions noun phrases can receive a temporally independent interpretation (i.e., the NP and VP are evaluated with respect to different times). Previous work has focused on the role played by context, the type of determiner, or the type of noun. Research on context argues that the temporal location of noun phrases is independent of verbal tense and determined by the context (Enç, 1981, 1986). Work on determiner type generalizes this to be the case if and only if the NP is presuppositional (Musan, 1995, 1999). Tonhauser's (2002) example in (1) challenges this: despite its non-presuppositional determiner, *some crew members* is naturally interpreted at the time of the Titanic being operative. Tonhauser (2002, 2006, 2020) concludes that noun phrases are best analyzed as temporal anaphors due to their property of referring directly to times in the context, suggesting first parallels between nominal and verbal temporality.

(1) *Context: At a reunion of the survivors of the Titanic disaster.*
Look, there are even some crew members here. (Tonhauser, 2002: 294)

Theories on noun type propose that the lexical temporal properties of the noun affect the temporal interpretation (Rapp, 2015; O'Leary, 2022). Under this view, *crew members* is analyzed as something like *former crew members* to capture that the relevant individuals were crew members at some time before the reunion. Crucially, this does not reconcile the contradiction of

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examples such as (1) to Musan's generalization. Despite being temporally independent, the assumption of *former* as part of the noun denotation is not presuppositional. Thus, the crew members of the Titanic continue to prevent a unified analysis under which the temporal independence of (1) can be explained in terms of presuppositionality.

Since the gap between Musan and Tonhauser cannot be accounted for via bridging (Schwarz, 2009) or quantifier domain restriction (Stanley and Gendler Szabó, 2000), I propose to extend analyses of verbal temporal phenomena, such as pronominal tense and superficial tenselessness, to the nominal domain. Nominal semantic representation is enriched to include lexical tense and aspect. The lexical aspect separates eventive from stative nouns motivated by their underlying ontological properties. Although nouns lack tense morphology, I argue that noun phrases possess a covert time pronoun that directly refers to salient times in the discourse. The pronoun is presuppositionally restricted by one of two tense features whose selection is determined by the lexical aspect of the noun. The tense feature selected by eventive nouns restricts possible referents to being non-future. Stative nouns select one that restricts the noun phrase time to include the utterance time. This novel approach to the temporal interpretation of NPs unifies previous accounts, explains the status of (1) in terms of temporal presuppositionality, and treats temporality in language as a uniform phenomenon across domains.

## 2. Background

In this section, an overview of the background relevant for the proposal is provided. First, necessary terminology concerning the different times used in language is established, followed by a summary of earlier approaches.

### 2.1. Times in language across domains

I will follow Tonhauser's (2021) time relational framework of noun phrases which, in turn, is an extension of Klein's (1994). According to the latter, three times are necessary for the temporal interpretation of sentences. For this, consider the two examples in (2).

(2) a. Ede arrived this morning.
b. When Ede arrived this morning, Cornelia had already left.

Intuitively, it may seem to suffice to talk about (2a) in terms of two times: The time at which the sentence is uttered and the time at which Ede arrived, i.e., *this morning*. The past perfect construction in (2b), however, highlights the need to further distinguish between the time to which the sentence as whole refers (i.e., *this morning*) and the times at which the events of Ede arriving and Cornelia leaving take place (i.e., at some point within *this morning* and some time before *this morning* respectively). The three times are given in (3).

(3) a. Utterance time: The time at which a sentence is uttered.
b. Reference time:[2] The time to which the speaker's claim refers.
c. Event time: The time of the eventuality taking place.

[2]Klein (1994) uses the term *topic time*; however, I find Reichenbach's (1947) *reference time* more intuitive, as verb (or noun) phrases quite literally refer to a time in the context.

The different times are associated with distinct properties. Specifically, the utterance time is deictic, given by the context of utterance, the reference time is a temporal anaphor (Partee, 1984), and the event time is existentially quantified (Klein, 1994). The semantic function of tense and aspect is to establish temporal relations between them. Tense is defined to indicate the location of the reference time relative to the utterance time. Aspect contributes a particular relation between the event time and the reference time. Going back to the examples in (2), the past tense picks out the reference time *this morning*, and contributes an anteriority relation between it and the utterance time. While the lack of aspectual markers results in the event time being subsumed in the reference time in (2a), the past perfect construction contributes that Cornelia's leaving event takes place at some undefined point before the reference time (2b).

Like verb phrases, nominals contribute temporal information to the utterance. In order to adequately talk about the temporal properties of noun phrases, Tonhauser (2021) extends the three way distinction to the nominal domain: the utterance time, the noun phrase time (i.e., the time at which the NP is evaluated), and the nominal event time (i.e., the time at which the nominal property holds of its referent). Similar to the examples in (2), in the absence of aspectual markers, the noun phrase time and event time coincide but this need not be. Consider (4).[3]

(4) a. In 2007, I met a priest.
b. In 2007, I met a former priest.

On their salient reading, the noun phrase time of both nominals in (4) is 2007. The event time of *a priest* in (4a) coincides with the noun phrase time, i.e., the individual was a priest in 2007. In contrast, the event time of the nominal in (4b) must *not* coincide with the noun phrase time and is instead restricted to precede it, i.e., the individual was a priest at some point before - but not during - 2007. Tonhauser (2021) points out that the default are cases like (4a) where the nominal event time overlaps the noun phrase time. Like their verbal counterparts, the noun phrase time is a temporal anaphor, and the event time existential (cf. Tonhauser, 2021). This terminology allows us to define what it means for a noun phrase to be temporally independent, given in (5).

(5) The temporal (in-)dependence of noun phrases:
A noun phrase is temporally independent if and only if the noun phrase time is distinct from the verbal reference time.

Under this view, the crew member example in (1) is considered temporally independent: The noun phrase *some crew members* refers to the time of the Titanic being operative and the verbal predicate of being at the reunion refers to the time of utterance. In contrast, the salient reading of (4b) is then *not* considered temporally independent: Both, the verb and noun phrase, refer to the same reference time, *2007*.[4]

[3]For this comparison I am assuming that the temporal adjective *former* is a nominal aspectual marker that quantifies over the noun's event time. The adjective asserts that the nominal property holds at some point before (but not during) the noun phrase time (cf. Tonhauser, 2006).

[4]This view is in opposition to the weaker definition according to which a nouns phrase is independent if the nominal event time is distinct from the (verbal) reference time. There is no conclusive argument for either definition, and both variations are used in the literature; though, not always made explicit because earlier theories do not distinguish between the noun phrase time and event time.

## 2.2. Context

Previous work on context argues that the temporal location of noun phrases is independent of the time introduced by verbal tense, and that context determines the time at which NPs are temporally evaluated (Enç, 1981, 1986). A case in point is Enç's famous example in (6). Despite the present tense of the VP, the individuals quantified over were fugitives at some past time and are in jail at the utterance time.

(6) *Context: Last month, five people broke out of prison. Today, the last one was caught.*
Every fugitive is now in jail. (Enç, 1981: 38)

Enç (1986: 422-423) concludes that the only constraints on the temporal argument of the noun phrase are pragmatic, and the noun phrase time refers to times previously introduced in the context by tenses and temporal adverbs. According to this proposal, the noun phrase time of *every fugitive* can be a past time, as it is recoverable from the context in (6).

## 2.3. Determiner type

The contextual approach was challenged by Musan (1995, 1999) who argues that only presuppositional noun phrases may be temporally independent, while non-presuppositional noun phrases *must* be evaluated at the time introduced by verbal tense. The author illustrates this dichotomy with the example in (7). Only the nominal in (7a) allows for an interpretation under which the individuals were fugitives in the past and are in jail now. In contrast, she argues, the nominal in (7b) must be evaluated with respect to the same time as the VP, either resulting in a contradictory interpretation or one in which the individuals fled from something other than jail.

(7) a. Many [of the] fugitives are now in jail.
b. #There are many fugitives in jail. (Musan, 1995: 11)

According to Musan's proposal, strong determiners (i.e., determiners that cannot occur in existential constructions) are necessarily presuppositional. Weak determiners (i.e., determiners that can occur in existential constructions), on the other hand, may have a presuppositional or a non-presuppositional reading. The example in (7) is a case in point. In (7a) the weak determiner *many* as part of a partitive construction receives a presuppositional reading. The nominal presupposes the existence of its referents which allows it to be evaluated at a past time. In contrast, *many* in an existential construction forces a non-presuppositional reading of the determiner, only allowing for a temporally dependent interpretation, i.e., a reading under which the individuals are fugitives and in jail at the same time. Like Enç (1986), Musan assumes that the temporal interpretation of (presuppositional) noun phrases is contextually determined.

## 2.4. Context - anaphoric noun phrases

Tonhauser (2020) adds to this discussion by showing that Musan's requirement of non-presuppositional NPs being temporally evaluated at the time introduced by the verbal tense is too strong. The example in (8) illustrates this convincingly. Although *some crew members* is part

of an existential construction and, thus, non-presuppositional according to Musan, it receives a temporally independent interpretation. The nominal is naturally interpreted at the time of the Titanic being operative rather than the time of the reunion.

(8) *Context: At a reunion of the survivors of the Titanic disaster.*
Look, there are even some crew members here.

The temporal anaphoricity exhibited in (8) is similar to the one shown in (6) despite the difference in determiner type. Building on this, Tonhauser (2020) argues that the noun phrase time is, in fact, a temporal anaphor by which she illustrates first similarities between the temporality of the verbal and nominal domain.

Temporal anaphora are subject to deictic, discourse anaphoric, and bound interpretations, first shown by Partee (1973, 1984) for verbal tense in (9). Deictic and discourse anaphoric interpretations receive their semantic value from temporal referents introduced in the discourse. Bound interpretations do not pick out a referent in the context; instead, they function as a variable bound by a quantificational operator.

(9) a. I didn't turn off the stove! [deictic]
b. Sheila had a party last Friday. Sam got drunk. [discourse anaphoric]
c. Whenever Mary telephoned, Sam was asleep. [bound]
(Partee, 1973: 603, 1984: 245-246)

The past tense in (9a) is anaphoric to some time before leaving the apartment, whose identity is made clear through non-linguistic context, at which the speaker did not turn off the stove. In (9b), the first sentence introduces a reference time which serves as a temporal antecedent for the time at which Sam got drunk. Finally, the *whenever*-clause in the sentence (9c) denotes a quantifier that is applied to the times of Sam being asleep. Similarly, the examples in (10) show that the interpretations of temporal anaphora are available for noun phrases as well.

(10) a. When I first met **my fiance**, I was with my ex-girlfriend. After we broke up, I started dating him. [deictic]
b. In November, Mary sold raffle tickets at her art show. **No visitor** returned the following month to claim the prize. [discourse anaphoric]
c. Whenever Peter hosted a birthday party for a friend last year, **some guest** sued him the next year. [bound]
(Tonhauser, 2020: 12)

The bold-faced noun phrase in (10a) receives a deictic interpretation according to which the time at which *my fiance* is evaluated is anaphoric to the utterance time, rather than the time of first meeting them. *No visitor* in (10b) is temporally interpreted at the time introduced by the first sentence, the art show in November, instead of the time of claiming the prize. Lastly, the temporal interpretation of the noun phrase *some guest* in (10c) is bound by the *whenever*-clause where the relevant individuals are guests at times at which Peter hosted a party and not at the times at which they sued him.

Importantly, analyzing noun phrases as temporal anaphors entails that the temporal noun phrase interpretation is context dependent as motivated by Enç (1981, 1986) and Musan (1995, 1999).

## 2.5. Noun type

More recent accounts explain the crew member example in (8) in which non-presuppositional nominals receive an independent interpretation by assuming that lexical properties of nouns may affect the temporal interpretation of NPs. To my knowledge there are two such accounts in the literature.

### 2.5.1. Label nouns

Rapp (2015) draws from the verbal domain and argues that so-called *label nouns* are eventive personal nouns which can be used to characterize an individual after the event time. Label nouns presuppose one or several events in which the referents are involved.[5]

(11) Eventive personal nouns:
   a. Single event nouns (e.g. *Mörder* 'murderer', *Opfer* 'victim', *Sieger* 'winner')
   b. Habitual event nouns (e.g. *Betreuer* 'care taker', *Lehrer* 'teacher', *Schreiner* 'carpenter', *Flüchtling* 'fugitive')

(Rapp, 2015: 502-503)

Rapp notes that pragmatics are the biggest factor whether a noun is lexicalized with a single or habitual meaning, as well as the Aktionsart of the underlying verb. She represents single event nouns like *murderer* in (12a), where the run-time of the murder event can be before or equal to the noun phrase time. Habitual event nouns such as *teacher* are represented by assuming series of events with the reference time being temporally located somewhere between the first and last event (12b).

(12) a. $[\![\textbf{murderer}]\!]^g = \lambda x.\lambda t.\exists y[\exists e[MURDER(y,x,e)\&\tau(e) \leq t]]$
   b. $[\![\textbf{teacher}]\!]^g = \lambda x.\lambda t.\exists y[\exists e_1...e_n[TEACH(y,x,e_1...e_n)\&\tau(e_1) \leq t \leq (e_n)]]$

(Rapp, 2015: 502-504)

This way, eventive nouns headed by a non-presuppositional determiner may allow for an interpretation at which the nominal property holds before the time at which it is evaluated.

### 2.5.2. Flexibility of nouns

O'Leary (2022) argues that nouns have different sets of available event times, i.e., the intervals throughout which the nominal property holds of their referents.[6] Based on this, the author postulates that all stage nouns separate into two lexical aspectual classes that affect the temporal interpretation of nominals. The two classes are illustrated in (13).

(13) a. A fugitive is in jail.
   b. #A bachelor is married. (O'Leary, 2022: 5)

[5]In a personal conversation Rapp clarified that eventive nouns, such as in *Ron is a murderer*, do not presuppose the existence of an event. Instead, eventive nouns used in a definite description (e.g., *the murderer is bald*) invoke an existence presupposition of the event.

[6]Instead of *nominal event time*, O'Leary uses the analogous term *property time*.

While (13a) can be interpreted as *a former fugitive is in jail*, (13b) does not allow an interpretation that there is a former bachelor who is married. O'Leary calls nouns that behave like *fugitive* flexible nouns and nouns like *bachelor* inflexible nouns, formalized in (14).

(14) a. $[\![\text{flexible noun}]\!]^g = \lambda t.\lambda x.\exists t'\colon t' \leq t \wedge noun(x)(t')$
b. $[\![\text{inflexible noun}]\!]^g = \lambda t.\lambda x.\exists t'\colon t' \circ t \wedge noun(x)(t')$ (O'Leary, 2022: 47)

Under this view, it is stipulated that in unembedded clauses the noun phrase time of any nominal with a non-presuppositional determiner allows to be evaluated with respect to one of two times:[7] the time introduced by verbal tense or the utterance time (O'Leary, 2022: 46). In addition to this, the nominal event time is existentially quantified over. In the case of flexible nouns, the event time may be before or equal to its noun phrase time (14a). For inflexible nouns, the event time and noun phrase time must overlap.

## 3. The obstacle to a unified analysis

We may then summarize the insights of previous theories as the set of (temporal) properties of noun phrases in (15).

(15) The temporal properties of noun phrases:
a. The temporal location of noun phrases is independent of the time introduced by verbal tense. Context determines the time at which NPs are temporally evaluated.
b. A noun phrase can be temporally independent if and only if it is presuppositional.
c. Noun phrases are temporal anaphors that pick out salient times in the context.
d. The lexical temporal properties of the noun affect the noun interpretation.

Crucially, the properties are not necessarily mutually exclusive. However, Tonhauser's (2002) crew member example, repeated in (16), has so far prevented a unified analysis. As previously stated, the temporal interpretation of *some crew members* obeys (15a) and (15c), but seems to violate (15b).

(16) *Context: At a reunion of the survivors of the Titanic disaster.*
Look, there are even some crew members here.

More recent theories assume that the lexical temporal properties of the noun affect the temporal interpretation (15d) and, specifically O'Leary's (2022), commands a high explanatory power in terms of accounting for the empirical landscape. Yet, they do not reconcile the contradiction of the temporal independence of (16) to the generalization that only presuppositional NPs can be independent. Under O'Leary's (2022) view, *crew member* is assumed to be a flexible noun with the semantics in (17a). Assuming a pronominal analysis for verbal tense (Partee, 1973; Kratzer, 1998), Tonhauser's example in (16) receives the truth-conditions in (17b).[8]

(17) a. $[\![\textbf{crew member}]\!]^{g,c} = \lambda t.\lambda x.\exists t'\colon t' \leq t \wedge cm'(x)(t')$

[7] Rather than noun phrase time, O'Leary's uses the term *input time*.

[8] Note that O'Leary (2022) adopts a quantificational approach to tense as her semantic theory on (non-presuppositional) noun phrase interpretation relies heavily on scopal relations. However, she assumes a pronominal view of tense for her analysis of presuppositional noun phrases couched in DRT. The analysis here is spelled out in terms of the framework I adopt in this paper. This difference is not reflected in the given truth-conditions.

b. $[\![(16)]\!]^{g,c}$ is defined only if $g(1) \subseteq t_c$. ($t_c$ = UT)
When defined, $[\![(16)]\!]^{g,c} = 1$ iff $\exists x \exists t'$: $t' \leq g(1) \wedge cm'(x)(t') \wedge$ *be-present*$'(x)(g(1))$

The temporal independence of (16) is achieved by existentially quantifying over the nominal event time and allowing it to precede the noun phrase time. The analysis in (17b) predicts that the relevant individuals were crew members at a time before the reunion. However, the anteriority meaning as part of the noun denotation in (17a) results in truth-conditions that are too weak, including individuals who were crew members after the Titanic had already sunk, and does not invoke presuppositionality. Thus, the temporal independence of nominals headed by a non-presuppositional determiner such as (16) continues to prevent a unified analysis under which their status can be explained in terms of presuppositionality.

Before proposing an alternative approach that aims to explain (16) by means of a unifying analysis of (15), I would first like to entertain the possibility that the issues concerning the lack of presuppositionality and anaphoricity in (17) could be reconciled with other available options in the literature. The first point concerns the NP's status of temporal (in-)dependence in (17b) which may resolve its violation of Musan's generalization. The second point relates to bridging in the spirit of Schwarz (2009) and how it might rescue the nominal being presuppositional and anaphoric. Lastly, quantifier domain restriction is considered to potentially account for the lack of anaphoricity.

### 3.1. The status of *some crew members*

The reader may have noticed that under the definition of temporal independence given in (5), *some crew members* in (17b) is not considered temporally independent. The noun and verb phrase are both evaluated at the same reference time, the reunion, whose temporal value is assigned to $g(1)$. One might now argue that by weakening the definition of temporal independence to only require that the nominal event time be distinct from the verb phrase time, O'Leary's (2022) theory no longer violates the property in (15b). This is indeed the case for the crew member example, but consider the sentence in (18).

(18) A woman was born in 1973.[9]
a. $[\![\textbf{woman}]\!]^{g,c} = \lambda t.\lambda x.\exists t'$: $t' \circ t \wedge woman'(x)(t')$
b. $[\![(18)]\!]^{g,c}$ is defined only if $g(2) < t_c$.
When defined, $[\![(16)]\!]^{g,c} = 1$ iff $\exists x \exists t'$: $t' \circ t_c \wedge woman'(x)(t') \wedge$ *be-born*$'(x)(g(2))$

The noun *woman* is an inflexible noun with the semantics in (18a) that denotes that the time of being a woman has to overlap with the noun phrase time.[10] As illustrated in (18b), the noun phrase time and event time of *a woman* thus both coincide with the utterance time (represented as $t_c$). The verb phrase time is evaluated at 1973, which is the value assigned to $g(2)$. Crucially, the nominal is temporally independent according to either definition we may stipulate despite

[9]Example from O'Leary (p.c.).
[10]O'Leary's test to determine whether a noun is flexible or inflexible is if they allow modification by *former*. *Woman* (generally) does not, which makes it inflexible. Note that this does not account for cases in which the referent has, for instance, undergone gender reassignment surgery. Compare with section 4.1.2 how those examples can be explained.

not being presuppositional. Thus, Musan's generalization remains violated and a unified account a distant goal.

### 3.2. Bridging the Titanic

As for the lack of anaphoricity in (17b), it is sometimes noted in passing that the relational noun *crew member* involves a covert prepositional phrase that actually means something like *crew members of the Titanic*. This would then account for the anaphoricity via bridging and (potentially) introduce presuppositionality with the definite determiner.[11] Conversely, from this follows that non-relational nouns do not exhibit the same kind of anaphoricity. For this consider the noun *novelist* which is non-relational according to the tests for relationality in (19).

(19) a. The crew member(s) of the Titanic
b. #The novelist of the book/novel. (Schwarz, 2009: 248)

If the anaphoricity in (16) was indeed due to the noun's relation property, it would predict that non-relational nouns are not anaphoric in similar contexts. This is not borne out: *Novelist* exhibits anaphoricity in (20) despite not being relational.

(20) *Context: At a 40-year reunion for the associates of a no longer existing publisher.*
Wow, everyone came. Look, there are even some novelists here.

Just like (16), the context in (20) does not necessarily exclude individuals who are crew members/novelists at the time of the reunion. Nevertheless, the natural interpretation of the nominal is the time at which the publisher was still in business and published said novelists. Due to this under-generalization, the anaphoricity is therefore not fully accounted by bridging.

### 3.3. Quantifier domain restriction

A reviewer noted that the lack of anaphoricity in (17) might be reconciled by simply restricting the domain of the quantifier à la Stanley and Gendler Szabó (2000). The idea of domain restriction is illustrated with (21).

(21) I fed every cat.

Most likely (21) will be used to express that the speaker fed a restricted class of cats (e.g., the cats the speaker owns) rather than claiming that they fed every cat in existence. The domain over which the quantifier *every* ranges is restricted by the context of utterance. In a similar fashion, one may argue that the nominal *some crew members* under the Titanic scenario is contextually restricted to the set of individuals who were crew members on the Titanic. This approach would predict that any noun phrase can be anaphoric if the context gives rise to a salient time, which is not too dissimilar to the proposals made by Enç (1981) and Tonhauser (2020). However, this leads to over-generalization, as shown in (22), where the only difference is the noun upon which the ability to refer to past times depends.[12]

[11] Though, it is also possible that the determiner in that instance is semantically empty.
[12] O'Leary (2022).

(22) *Context: At a 1932 reunion for the survivors of the 1912 Titanic disaster.*
   a. Look, there are even some crew members here.
   b. Look, there are even some 30 year olds here.

Only the noun phrase in (22a) allows for a reading under which the individuals were crew members at the time of the Titanic. In contrast, the nominal in (22b) must be interpreted at the time of the reunion, and does not give rise to a reading where the relevant individuals were 30 back then and 50 at the reunion.

Note that there is a second quantifier whose domain we might consider restricting: the existential quantifier over the nominal event time (represented as $\exists t'$ in (17a)). After all, the truth-conditions in (17b) are under-specified so as to include crew members at the time of the Titanic. Recall, in section 2.1, the noun phrase time and event time were distinguished by their properties. The noun phrase time is an anaphor, while the event time is existentially bound. Restricting the domain of the quantifier over (event) times in the way suggested here would imply that the event time is an anaphor, too. This would predict that noun phrases can be evaluated with respect to two times simultaneously which seems conceptually difficult to reconcile with established assumptions about times in language.

As a result, neither restricting the domain of the determiner's quantifier, nor restricting that of the noun's event time will solve the issue of anaphoricity without over-generalizing or leading to odd predictions.

## 4. Proposal

The tension between Musan's generalization that only presuppositional NPs can be temporally independent and Tonhauser's claim that the noun phrase time is a temporal anaphor is very intriguing. At face value, it provides compelling evidence against Musan showing that even NPs with a non-presuppositional determiner can be independent. Under the surface, however, it contains the key with which we can reconcile both views: From the assumption of NP's being temporal anaphors follows the presupposition of a temporal antecedent. In the verbal domain, temporal presuppositions are traditionally formalized as part of the tense denotation. The appeal of adopting such an analysis to the nominal domain is three-fold: it entails the set of temporal properties of noun phrases in (15), explains the temporal independence of the crew member example in terms of temporal presuppositionality, and provides a uniform analysis of temporality across domains.

Tonhauser (2002, 2006, 2020) suggests first parallels between the temporal properties of noun phrases and verbal tense by showing that both involve temporal anaphora. On top of that, Rapp (2015) made a case for nouns benefiting from a lexical aspectual treatment based on the underlying verbal properties of the noun. Building on these contributions, I propose to enrich nominal semantic representations to include lexical tense and aspect. The separation of nouns into eventive and stative lexical aspectual classes is motivated by their underlying ontological properties. The two classes map onto distinct patterns of available temporal interpretations of noun phrases. Contrasting these patterns to the temporal interpretation of tenseless languages, such as St'át'imcets (Matthewson, 2006), motivates the assumption of a covert time pronoun

as part of the NP. The pronoun recovers its value from the context and is presuppositionally restricted by one of two tense features whose selection is determined by the lexical aspect of the noun. The tense feature of eventive nouns is semantically under-specified and restricts the noun phrase time to being non-future. Stative nouns select a tense feature that is restricted to include the utterance time.

### 4.1. Lexical aspect

Rapp (2015) and O'Leary (2022) claim that nouns have lexical aspectual properties that affect the way in which NPs are temporally interpreted. Rapp identifies *label nouns* (e.g., *fugitive*) as having eventive properties that allow for temporally independent interpretations in German participles. Independently from Rapp, O'Leary (2022) systematically establishes two classes of nouns with only one allowing an (independent) past interpretation, as the contrast, repeated in (23), illustrates.

(23) a. A fugitive is in jail.
b. #A bachelor is married.

Interestingly, Rapp's idea of some nouns being eventive neatly maps onto O'Leary's distinction in (23), i.e., *fugitive* has eventive properties, *bachelor* does not. Thus, fleshing out the idea of *label nouns* provides ontological evidence for O'Leary's distinction and may give rise to an explanation as to why the two noun classes behave differently with respect to their temporal interpretations. Additionally, it aims to demonstrate that nouns benefit from a (verbal) lexical aspectual treatment, and constitutes the foundation of my analysis of extending verbal temporality to the nominal domain.

#### 4.1.1. Eventive vs. stative nouns

I distinguish two (main) classes of nouns: eventive and stative, given in (24).

(24) a. Eventive nouns:
*murderer, fugitive, champion, widow, crew member, teacher, student, CEO, ...*
b. Stative nouns:
*man, bachelor, woman, teenager, adult, 30 year old, mortal, person, ...*

Eventive nouns are characterized by entailing an event in which their referent is involved. In contrast, stative nouns do not entail an event; they merely assign a property to their referent. Compare (25) and (26).

(25) Ron is a murderer.
$\models$ Ron killed someone.

(26) Ron is a man.
$\not\models$ any event.

For (25) to be true, it has to be the case that Ron murdered someone. The truth of (26), however, does not depend on Ron being involved in any particular event.[13] Further evidence for

[13] One could argue that Ron's birth is an event in which he has to be involved in. In this case, we would have to restrict the event implication further to, for instance, actions.

the ontological distinction between eventive and stative nouns is the application of common diagnostics for (verbal) event expressions to nouns, given in (27).[14]

(27) Linguistic diagnostics for events:
  a. Event expressions combine with locative and temporal modifiers.
  b. Event expressions combine with manner adverbials.
  c. Event expressions can be picked up via anaphoric pronouns.
  d. Event expressions can be quantified.

(Maienborn, 2019: 30, adjusted)

If nouns like *murderer* were eventive, its event would be expected to behave in the ways indicated in (27). This is borne out, as shown in (28). The expression in (28a) describes a particular individual who only murders in September or downtown. The nominal in (28b) is ambiguous between someone who is a murderer and gentle or someone who murders gently.[15] The sentence in (28c) is construed to mean that every murderer regrets that they murdered someone, where the murder event serves as the antecedent for the anaphoric pronoun *it*. Lastly, (28d) conveys the number of times its referent has murdered.

(28) Eventive nouns:
  a. The September/downtown murderer
  b. The gentle murderer
  c. Every murderer regrets that he did it.
  d. The 5-time murderer

Given this evidence, it is a reasonable assumption that eventive nouns not only entail an event, but that it is compositionally accessible. This is formalized in (29) where nominal predicates are treated as functions from events and individuals to truth values and express that the nominal property holds of its referent throughout the event.

(29) $[\![\text{eventive noun}]\!]^{g,c} = \lambda e.\lambda x.noun'_{ev}(e)(x)$

Stative nouns were shown not to entail an event, i.e., the referent of the noun is not required to be involved in any event for them to be assigned the property denoted by it. Applying the diagnostics for event expressions to stative nouns like *man*, as shown in (30), reinforces the assumption of an ontological distinction to nouns like *murderer*: Only (30b) does not result in oddness, but then it does not give rise to the same ambiguity as (28b).

(30) Stative nouns:
  a. #The September/downtown man
  b. The gentle man
  c. #Every man regrets that he did it.
  d. #The 5-time man

[14]Maienborn (2019) uses the diagnostics to show the contrast between Davidsonian eventualities, i.e., events and states, and so-called Kimian states. She illustrates that the former are spatio-temporal entities, and thus subject to the diagnostics in (27). In contrast, Kimian states are ontologically poorer and fail some of the tests (cf. Maienborn, 2019). The behavior of stative nouns seems closer to the notion of Kimian states. However, I will continue to call them just *stative nouns*. I thank Daniel Hole for making me aware that I need to clarify on this point.

[15]Larson (1998) argues that this ambiguity arises as part of the noun having two available arguments for the adjective to modify. My analysis is in line with this assumption (cf. (29)).

As a result, stative nouns are treated as functions from states and individuals to truth values that denote that the nominal property holds of its referent throughout the states it is related to (31).

(31) $[\![\text{stative noun}]\!]^{g,c} = \lambda s.\lambda x.noun'_{st}(s)(x)$

According to section 2.1, the nominal event time is existentially bound and, by default, coincides with the noun phrase time. Based on this, we may model the semantics of the default nominal lexical aspect. The default aspect is phonologically empty and situated in its own aspect projection within the NP c-commanding the N-head (32a), with the semantics in (32).[16]

(32) Nominal lexical aspect:
- a. $[_{DP}\ [_{D}\ a]\ [_{NP}\ [_{Asp}\ \varnothing_{\alpha}]\ [_{N'}\ [_{N}\ noun_{\alpha}]]]]$
- b. $[\![\varnothing_{ev}]\!]^{g,c} = \lambda P.\lambda t.\lambda x.\exists e{:}\tau(e) \circ t \wedge P(e)(x)$
- c. $[\![\varnothing_{st}]\!]^{g,c} = \lambda P.\lambda t.\lambda x.\exists s{:}\tau(s) \circ t \wedge P(s)(x)$

The two aspectual operators contribute a quantifier over events (32b) or states in (32c) and establish that their run-time overlap with the noun phrase time, represented as $\lambda t$. Naturally, eventive nouns such as *crew member* are restricted to select the eventive operator, while stative nouns like *man* select the stative one. The denotation of nouns describing their lexical aspectual properties then amount to (33).

(33)
- a. $[\![\textbf{crew member}]\!]^{g,c} = .\lambda t.\lambda x.\exists e{:}\tau(e) \circ t \wedge cm'(e)(x)$
- b. $[\![\textbf{man}]\!]^{g,c} = \lambda t.\lambda x.\exists s{:}\tau(s) \circ t \wedge man'(s)(x)$

In words, the nominal predicates are functions from times and individuals to truth-values such that there is an event/state whose run-time overlaps with the noun phrase time and the nominal property holds of its referent throughout the event/state. At this point, there is barely a semantic difference with respect to their temporality. The difference is reflected in combination with the second component of the proposal, lexical tense.

### 4.1.2. Eventive nouns: achievement and activity

A brief note on eventive nouns: there are further aspectual differences within this class. Consider *crew member* or any other noun denoting individuals that perform an activity. Clearly, it entails the existence of one or several events. For the individual to be a crew member, it must be given that they are involved in some kind of 'crew member events' (e.g., cleaning the decks, maintaining equipment, etc.). For this reason, I am assuming the two sub-classes in (34).

(34) Eventive nouns:[17]
- a. Achievement nouns: *murderer, champion, widow, fugitive, ...*
- b. Activity nouns: *crew member, teacher, dancer, gamer, ...*

Unlike achievement nouns, activity nouns fail the diagnostics in (27c) and (27d). This is because achievement nouns entail a definite event which is clearly characterized (e.g., murder,

[16]The default aspect cannot co-occur with overt aspectual modifiers like *former*, which introduces an anteriority relation between the nominal event time and the noun phrase time and can only modify eventive nouns.

[17]This distinction is similar to Rapp's (2015) categories in (11). Achievement nouns correspond to her single event nouns and activity nouns to her habitual event nouns.

winning championship, death of spouse, jail break, ...), which can then serve as an antecedent for pronouns or be counted. Activity nouns entail several generic events that are associated to that which the noun describes, which do not lend themselves to that kind of modification. Similar to verbal lexical aspect, the categories are somewhat shifty. Some nouns may have an activity as well as achievement reading, as in (35).

(35) a. John is a teacher at Goethe high-school. [activity]
b. John is a teacher but currently unemployed. [achievement]

Under the activity reading of *teacher* in (35a), John is involved in generic teacher events (e.g., teaching, grading, supervising, etc.). These events are negated by John's unemployment in the sentence in (35b). The noun receives an achievement reading that entails only one (definite) event that licenses John's description as a teacher: the completion of his teacher training. Most activity nouns that describe a profession entail their achievement reading.

Naturally, achievement nouns can also be coerced into an activity reading (e.g., a professional murderer), or stative nouns into eventive ones (e.g., a bachelor who lives the 'bachelor life-style' to the extreme or a woman who has undergone gender affirming surgery).[18] Eventive nouns, however, cannot be coerced into statives. There is more to be said about the difference between eventive nouns and their coercion processes, but since this (sub-)distinction is not reflected in their temporal interpretation patterns, I will not do this here. For the purpose of this paper, I will treat both kinds of eventive nouns as one homogeneous class.

### 4.2. Lexical tense

The idea of noun phrases having a (covert) tense is by no means novel. In fact, one of the first formal analyses for temporal noun phrase interpretation briefly makes such an assumption to account for the notorious fugitive example in (36a), where $P$ represents a past tense operator shifting the time at which the relevant individuals were fugitives to the past (36b).

(36) a. Every fugitive is in jail.
b. $\forall x[P[fugitive(x)] \rightarrow in\text{-}jail(x)]$ (Enç, 1986: 411)

The author ultimately rejects this view on the basis of nouns lacking tense morphology. Instead, she assumes a referential analysis in which temporal variables are introduced in the object language (37a) with their value being determined by the variable assignment (37b). This allows nominal predicates to be relativized to times introduced in the context (37c); for example, $g(3)$ may be assigned the temporal value of when they broke out of jail.

(37) Every fugitive is in jail.
a. $[_{NP}\ [_{D}$ every$]\ [_{N'}\ [t_3]\ [_{N}$ fugitive$]]]$
b. $[\![t_3]\!]^{g,c} = g(3)$
c. $\forall x[fugitive(x)(g(3))] \rightarrow in\text{-}jail(x)]$

Despite their generalization issues, which I will not discuss here, the analyses coupled with Tonhauser's evidence of noun phrases being anaphoric, a defining feature of verbal tense, mo-

[18] The event entailed by the coerced use of *woman* need not be surgery. It may as well be the act of coming out. I thank James Holmes Smith for this suggestion as well as discussions on this point.

tivate further investigation in this direction. Following this, the available interpretation patterns of noun phrases are reminiscent of the temporal behavior of (superficially) tenseless languages, whose analysis may provide just the necessary formal tools with which we can bring together all of the previous insights.

There are a number of languages, such as St'át'imcets (Lillooet Salish), that lack overt tense morphology which results in the temporal interpretation of finite clauses being compatible with a past or present time. Consider (38) and (39).

(38) táyt-kan
hungry-1SG.SUBJ
'I was hungry / I am hungry.'

(39) sáy'sez'-lhkan
play-1SG.SUBJ
'I played / I am playing.'
(Matthewson, 2006: 676)

Interestingly, the default interpretation of the above examples is tied to the lexical aspect of the verbal predicate. In out of the blue contexts, stative predicates, like (38), strongly favor a present tense interpretation. Activity predicates, such as (39), show no preference, and achievement predicates strongly favor a past tense interpretation. Apart from that, the temporal location of the eventuality is determined by salient times in the context, given they are non-future.

In a similar fashion, (eventive) nominals are compatible with non-future times. The eventive noun *fugitive* in (40) receives a present and past interpretation, but not a future one. In O'Learyan fashion, a verbal predicate is chosen that contradicts a temporally dependent interpretation to exclude verbal tense interfering with the noun phrase interpretation.

(40) A fugitive
a. A fugitive was born in the 90s. [$t_{np}$: now]
b. *Context: talking about the jail break last month*
A fugitive is now in jail. [$t_{np}$: last month]
c. *Context: talking about the upcoming prison break*
#A fugitive is now in jail. [$t_{np}$: now]

In (40a), *a fugitive* refers to an individual who is currently a fugitive since they could not have been one at the time of their birth.[19] The sentence in (40b) describes someone who was a fugitive last month, while (40c) is odd because a future reading of the nominal is not available to rescue the contradiction. In contrast, stative nominals are only compatible with present times, shown in (41).

(41) A bachelor
a. A bachelor was born in the 90s. [$t_{np}$: now]
b. *Context: talking about the bachelor party last month*
#A bachelor is now married. [$t_{np}$: now]
c. *Context: talking about the upcoming divorce*
#A bachelor is now married. [$t_{np}$: now]

[19] It may also describe an individual who was a fugitive at some point after their birth but before the speech time.

The nominal *a bachelor* in (41a) receives a present interpretation, but results in oddness when the only available time for the noun to be evaluated at is a past (41b) or future (41c) time.[20] The general pattern of lexical aspect affecting the interpretation of clauses in St'át'imcets extends to nominals: while achievement and activity predicates allow past and present interpretations, stative predicates not only favor but exclusively allow a present interpretation.[21]

Given the evidence from Tonhauser (2002, 2006, 2020) and the contrast to tenseless languages, we may model the temporal dimension of the NP on the basis of how temporal reference in (tenseless) languages is formalized (Partee, 1973; Kratzer, 1998; Matthewson, 2006; Cable, 2013). That is, the NP is enriched to include a tense projection, occupied by a covert time pronoun and a set of tense features (42). The pronoun (42b) recovers its value from salient times in the context, and comes with one of two tense features that impose a presupposition on its range. The tense feature selected by eventive nouns presuppose a non-future time (42c), the tense feature of statives restricts the value of possible referents to the speech time (42d).

(42) Lexical tense:

a. $[_{DP}\ [_{D}\ a]\ [_{NP}\ [_{TP}\ [T_2][\{\text{NON-FUT}_{ev}\ /\ \text{PRES}_{st}\}]]\ [_{N'}\ [_{Asp}\ \varnothing_{\alpha}]\ [_{N}\ noun_{\alpha}]]]]$

b. $[\![T_n]\!]^{g,c} = g(n)$

c. $[\![\text{NON-FUT}_{ev}]\!]^{g,c} = \lambda t.t \leq t_c.t$

d. $[\![\text{PRES}_{st}]\!]^{g,c} = \lambda t.t \subseteq t_c.t$

The denotation of a nominal predicate describing all of its temporal and aspectual properties then amounts to a function from individuals to truth-values such that the run-time of the event (43a) or state (43b) overlaps with the noun phrase time. The possible times relative to which the predicates can be evaluated are restricted by their respective presupposition.

(43) a. $[\![\textbf{fugitive}]\!]^{g,c}$ is defined only if $g(n) \leq t_c$.
When defined, $[\![\textbf{fugitive}]\!]^{g,c} = \lambda x.\exists e{:}\tau(e) \circ g(n) \wedge fugitive'(e)(x)$

b. $[\![\textbf{bachelor}]\!]^{g,c}$ is defined only if $g(n) \subseteq t_c$.
When defined, $[\![\textbf{bachelor}]\!]^{g,c} = \lambda x.\exists s{:}\tau(s) \circ g(n) \wedge bachelor'(s)(x)$

Importantly, (43) denote functions of nominal predicates whose interpretation occurs independent of verbal tense. Naturally, they can receive a dependent interpretation some of which may not be accounted for by (43). Consider, for instance, a future interpretation in (44), where the utterance time precedes the time of being a fugitive.

(44) John will be a fugitive.

In (40c) it was shown that *a fugitive* cannot independently refer to future times. Thus, verbal tense alone is responsible for the temporal location of *fugitive* in (44), and the lexical tense of the noun is not interpreted at all. Similar cases are found in the verbal domain where a past tense embedded under future-oriented attitude verbs do not contribute a past meaning (45).

(45) Mary predicted that she would know that she was pregnant the minute she got pregnant.
(Kratzer, 1998: 92)

[20] Technically, *bachelor* describes men who have never been married which would make (41c) odd either way. To be safe, consider *A 30 year old is 29 right now* under a context in which the referent's 30th birthday party is being planned for the following month. Its oddness confirms that independent future interpretations of statives are out.
[21] Determining the default (independent) interpretations of the nominals may be subject to future investigations.

For this, Kratzer proposes a zero pronoun to account for instances in which tenses do not seem to be interpreted. The zero pronoun has no interpretable features, carries no presupposition, and must be locally bound by the nearest lambda abstractor over times. The zero pronoun can be added to the nominal lexical tense paradigm, with its denotation in (46).

(46) $[\![\varnothing_n]\!]^{g,c} = g(n)$ (Kratzer, 1998: 101)

### 4.3. Analysis

With the given ingredients, the temporal interpretation of any noun with a non-presuppositional determiner can be derived.[22] Since the crew member example is at the heart of this paper, it will be used as an illustration and repeated one last time:

(47) *Context: At a reunion of the survivors of the Titanic disaster.*
Look, there are even some crew members here.

Given the above set-up, the sentence in (47) is assigned the LF in (48a). The temporal independent interpretation of (47) presupposes that the noun phrase time, $g(2)$, is assigned a value that precedes the utterance time, $t_c$. Since (47) is uttered under a scenario where this condition is satisfied, (48a) says of individuals who were crew members at some time that overlaps with that of the Titanic being operative, the value assigned to $g(2)$, and that they are at the reunion now, the value of $g(1)$.

(48) a. $[_{TP}\ \text{PRES}_1\ [_{vP}\ [_{DP}\ [_{D}\ \text{a}]\ [_{NP}\ [_{T}\ [T_2][\text{NON-FUT}]]\ [_{N'}\ [_{Asp}\ \varnothing]\ [_{N}\ \text{cm}]]]]\ [_{VP}\ \text{be-present}]]]$
b. $[\![(48a)]\!]^g$ is defined only if $g(1) \subseteq t_c$ and $g(2) \leq t_c$.
When defined, $[\![(48a)]\!]^g = 1$ iff $\exists x \exists e{:}\tau(e) \circ g(2) \wedge cm'(e)(x) \wedge be\text{-}present'(g(1))(x)$

The analysis sketched here entails the set of temporal properties of noun phrases in (15), and explains the temporal independence of (47) in terms of (temporal) presuppositionality. Specifically, nominal temporality receives an independent treatment of verbal tense with the context determining the NP's temporal location (15a). A noun phrase is independent if and only if it is presuppositional since tense introduces a temporal presupposition (15b). The noun phrase time is analyzed as a temporal anaphor (15c), whose potential referents are restricted by the lexical aspectual properties of the noun (15d).

## 5. Concluding remarks

This paper identifies several similarities between the temporality of the nominal and verbal domain that have been made throughout the literature which are used to motivate further investigation into this direction. Building on those parallels, it shows that nominal predicates benefit from a lexical aspectual treatment based on the underlying ontological properties of the noun

[22] From the data in 4.2 it can be inferred that the determiner does not contribute to the location of the noun phrase time. While I cannot spell this out for space reasons, I assume this to extend to presuppositional determiners. Note that presuppositional determiners allow stative nouns to refer to the past (e.g., *Every bachelor is now married*). In this case I assume that *every* presupposes a set of individuals whose property of being a bachelor is inherited through the presupposition, rather than the noun phrase time being located by *every*.

which maps onto distinct patterns of available temporal interpretations of noun phrases. Contrasting these patterns to the temporal interpretation of finite clauses in (superficially) tenseless languages motivates a lexical temporal analysis of noun phrase interpretation. Under this view, the noun phrase time is modelled as a time pronoun whose range is presuppositionally restricted by one of two tense features. The tense feature selection is determined by the lexical aspect of the noun. The appeal of this approach lies in the fact that it explains previously puzzling data in terms of the unification of previous accounts, and treats linguistic temporality as a uniform phenomenon across domains.

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